TSC 4059B
1 x 15 Low Frequency Distribution Amplifier

Operations and Maintenance Manual

Revision D

December, 2010

Contact Information

www.symmetricom.com

support@symmetricom.com

Phone:

Worldwide (Main Number) 1-408-428-7907

USA toll-free 1-888-367-7966 (1-888-FOR-SYMM)

TSC 4059B 1 x 15 Low Frequency Distribution Amplifier Operations and Maintenance Manual

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Revision History

Revision	Description	Date	Approved
C	Added signal impedance jumper setting information. Added appendix B: Sales and Customer Assistance.	7/2009	GAR
D	Revised Warranty, Shipping and Declaration of Conformity information. Changed power input specifications in Table 3. Changed relative humidity specifications in Table 4. Added revision history.	12/16/2010	GAR

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1: Introduction

Note

FIRST READ THIS MANUAL THROUGHLY!
This is especially true for the sections regarding **Safety** and **Installation.**

1.1 Symbols

These symbols appear throughout the manual as well as on the unit itself.

Note

This symbol means the following information is a note that gives you important information that may affect how you use the 4059B.

Caution, refer to manual. Read all instructions in Manual before using this product.

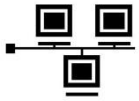
CE marking, attesting compliance to applicable European Directives

Caution – Risk of Electrical shock

Fuse symbol

Mains Power is ON

Mains Power is OFF



LAN port, NETWORK, DO NOT CONNECT TO TELECOM CONNECTIONS THAT CARRY HAZARDOUS VOLTAGES.

101010

Serial port connection, DO NOT CONNECT TO TELECOM CONNECTIONS THAT CARRY HAZARDOUS VOLTAGES.

Earth terminal symbol: Used to indicate an earth ground connection to chassis.

1.2 About This Manual

This manual tells you how to install, set up, monitor, and troubleshoot the 4059B.

"Chapter 1, Introduction" on page 5 explains symbols that appear in the manual and on the unit as well as documentation conventions. The chapter also briefly describes the 4059B.

"Chapter 2, Installing and Setting Up the 4059B" on page 9 contains important safety information and describes how to install the 4059B, and assign a fixed IP address.

"Chapter 3, Monitoring the 4059B" on page 14 describes how to monitor alarms.

"Chapter 4, Troubleshooting the 4059B" on page 16 describes how to replace fuses and verify operational problems.

"Chapter 5, Warranty and Shipping Information" on page 17 explains how to contact Symmetricom for warranty service and provides shipping guidelines.

"Chapter 6, Declaration of Conformity" on page 18 provides the information pertaining to CE marking of this product.

"Appendix A, Specifications" on page 20 contains the detailed specifications for the 4059B.

1.2.1 Conventions

This manual uses several typographical conventions to help explain how to use the 4059B.

Convention	Definition
Bold	Words in **bold** show: ■ Buttons and icons to click ■ Menu options to select ■ Commands to type ■ Non-variable information displayed in response to commands
Italics	Words in *italics* show: ■ Names of windows and dialog boxes ■ Variable information displayed in response to commands

1.3 4059B Overview

The TSC 4059 is a one input, fifteen output Low Frequency Distribution Amplifier housed in a 1U (1.75") high 19 inch rack mount chassis. It provides fifteen outputs from a single input with input impedance selectable to 50 ohms or 10k ohms in the 4059B. An Ethernet port on the rear panel provides the capability to remotely monitor the status of the input and all output signals. Any input or output failure in the unit will immediately provide an alarm to this port. The front panel provides green LED status for the input and green/red for all output signals, as well as indicating an input of 1 kHz, 10 kHz, or other. A green LED on the front panel also provides power status.

Figure 1 shows the unit front panel, and Figure 2 shows the rear panel.

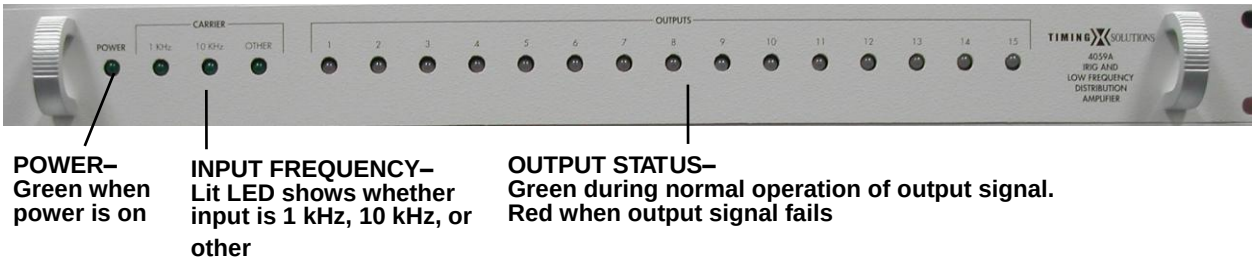


Figure 1: Front panel

Figure 2: Rear panel

2: Installing and Setting Up the 4059B

2.1 Safety First!

Warnings:

This unit is for INDOOR USE ONLY. It is not protected against a harmful ingress of moisture.

Do not attempt to install or operate this equipment if you have not first acquired proper training.

Equipment is intended to be installed in an Enclosed or Open type equipment rack

Ensure that all cables are properly connected. The power cord must be easy to remove from the back.

Verify that input line voltage and current capacity are within specifications before turning on power to the unit.

Disconnect all sources of input power before removing the top cover of this unit.

Operating and maintenance personnel must receive proper training before installing or maintaining electrical equipment.

2.2 Unpacking

To unpack the unit:

1. Unpack and carefully inspect the unit.
2. Check for physical damage.
3. If no physical damage is apparent, then proceed with making appropriate connections.
   - If physical damage is observed, then immediately contact Symmetricom and the carrier.
4. Save the shipping container for submitting any necessary claims to the carrier.

2.3 Cleaning

Warning

Do not spray or use too much liquid when cleaning the unit. Liquid can enter the unit and damage sensitive electronic components.

Clean the main chassis with a soft cloth dampened with a mild soap and water solution.

2.4 Installing the 4059B

The 4059B are shipped ready for installation into a standard 19" (48.3 cm) rack. Provisions are included for mounting General Devices slides with part numbers C-300-S-126, -128 and -130.

2.4.1 Required materials for installation

North American or European IEC power cord. One or the other will be supplied with the unit.

Customer supplied double shielded RG223 cables with BNC connectors from source, and to next devices in system.

Customer supplied LAN cable for network connection (RJ-45).

Rack-mount slide kit from General Devices, part number CC3041-00-S220 (Optional).

Rack mounting screws.

Screwdriver for the rack mount screws, and slide as needed.

2.4.2 Making Connections

2.4.2.1 Input Power

AC INPUT POWER - The input power to the unit is supplied through a detachable 3-prong power cable. First plug the female end into the male IEC-320 plug on the rear of the unit, then plug the male end of the cable into a 100V~ to 240V~, 50/60 Hz power source.

Warning

Ensure that this power supply cord is connected to a properly grounded --mains-- receptacle to ensure safety.

Since the unit does not have an AC Mains Power Switch, both the Appliance Inlet Connector and the Plug on the detachable type power supply cord are considered to be suitable Disconnect Means for disconnecting the unit from the AC Mains Supply. If the rear of the unit is not accessible after installation in the instrument rack, the User is responsible for the provision of a suitable external AC Disconnect Means for the unit.
After power-on, the unit runs a self-test in the following sequence:

- All LEDs will be turned on GREEN.
- Each output LED will sequentially be turned on RED and then GREEN.

- The input and output LEDs will be in the appropriate state relative to their respective signal status.

2.4.2.2 Input Signal

Connect the input signal cable to the **INPUT** BNC connector on the back of the unit. The input impedance can be set to either 50 ohms or 10k ohms on the 4059B. The unit ships from the factory set to 50 ohms input impedance as shown below in Figure 3.

To change the input impedance to 10k ohms, follow these steps:

1. Remove the top cover.
2. Move jumper that is placed on “50 OHM” header to the “HI-Z” header.
3. Replace the top cover.

2.4.2.3 Signal Input Impedance Jumpers

Two PCB jumpers (JP1 and JP2) provide flexibility for terminating different signal impedances to the 4059B. The two choices are 50 Ohms and Hi-Z.

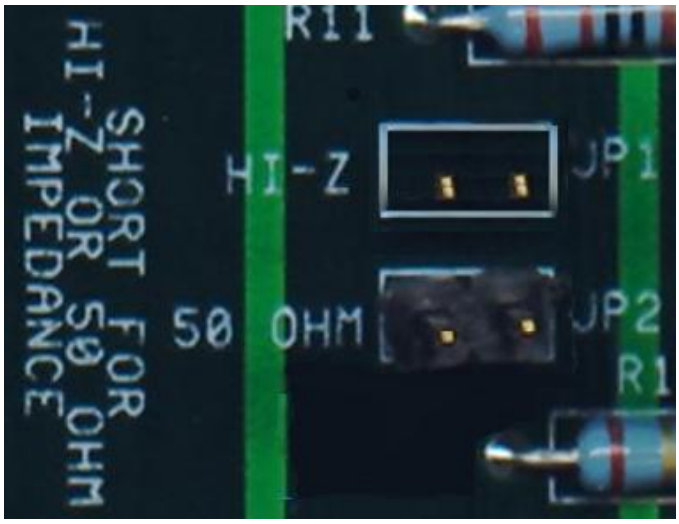


Figure 3: The Jumper is connected to JP2, selecting a 50 Ω input impedance

JP1 sets the gain to offset termination signal loss:

- **Installed** provides **unity gain.**
- **Not installed** provides **x2 gain.**

JP2 sets the input impedance:

- **Installed** sets the input impedance to **50 Ω.**
- **Not installed,** sets the input impedance to **10 K Ω.**

2.4.2.4 Output Signals

Connect up to fifteen cables to the **OUTPUT** BNC connectors on the rear panel of the unit to supply users with a copy of the input signal. The output impedance of each of the outputs is 50 ohms.

2.4.2.5 LAN - Ethernet Network Port

Connect a network LAN cable (not supplied with the unit) to the LAN port on the back of the unit.

2.5 Assigning a Static IP Address

The 4059B contains a Lantronix® Xport™ Ethernet to RS-232 converter, which provides the unit's Ethernet connection.

The unit ships from the factory with a default IP address of 0.0.0.0, which enables DHCP. If the network has a DHCP server, it will automatically assign the unit an IP address, gateway address, and subnet mask when the unit starts up.

To monitor multiple unit s remotely through their Ethernet connections without DHCP re-assigning IP addresses, you must assign each unit a static IP address. You identify which unit is the source of an alarm by its IP address. Each unit has its own unique hardware address, labeled MAC address, on a label on the rear panel. Follow the instructions in this section to manually assign a unit's static IP address.

Note

For more detailed information, see the *Xport™ User Manual.* Section 3.3 discusses several different ways that you can assign IP addresses. Chapter 4 explains how to configure a static IP address. You can download the *Xport™ User Manual* from the Lantronix® Web site as an Adobe® Acrobat® PDF file. Go to:
http://www.lantronix.com/products/eds/xport/XPort_UM_900-270.pdf

If you want to configure a static IP address of many different units, you can install the Lantronix® DeviceInstaller software. This software is available only by downloading from the Lantronix® Web site. Go to: http://www.lantronix.com/support/utils/dst/index.html. Alternatively you may use your companies IT protocol to determine the IP address assigned to a particular hardware address, then set a static address.

To manually assign the static IP address using the Lantronix® DeviceInstaller software:

1. Obtain the following network information from your system administrator for each 4059B you want to install:

   IP Address: _____ _____ _____ _____

   Subnet Mask: _____ _____ _____ _____

   Gateway: _____ _____ _____ _____

2. Connect a Windows® PC to the same local subnet as the 4059B.
3. Install and start the Lantronix® DeviceInstaller software.
4. Click the **Search Network** icon and search for XPORT devices connected to the network, press save and then exit.

5. Click the IP icon or select **Assign IP Address** on the **Tools** menu.
    - The hardware device number and IP address appear in the *Assign IP Address* dialog box.
5. Type the new IP address for the appropriate "**Hardware or Ethernet address**" and click **Set IP address.**
    - The new IP address appears in the Lantronix® DeviceInstaller window.
6. Test the IP address by pinging the unit's Xport™ on the Lantronix Xport Installer window. Click the **Ping** icon or select **Ping Device** on the **Tools** menu.
    - The *Ping Device* window should show the IP address of the unit's Xport™ device, and it should show successful replies if the IP address has been configured correctly.
7. Exit the browser.

To change the IP address using telnet:

1. Telnet to the assigned address, port 9999. Press enter within five seconds to enter the setup mode.
2. Select Option 0.
3. Set the IP address and follow on screen commands to save the setting.

Sending an **I** command will turn on the three front panel input LEDs for 2 seconds before returning to normal operation. This provides the capability for the user to ensure they are communicating over the Ethernet connection to the correct device via front panel feedback.

Note

If you move the 4059B to a different network hub after setting up the static IP address, the host computer may not be able to make a connection. You may need to release the IP address lease on your operating system.

3: Monitoring the 4059B

3.1 Accessing the System

You access the unit remotely by connecting to its Command-And-Response (CNR) Port through the Ethernet connection. The CNR port (Port 10001), which uses TCP/IP, lets users input commands, displays results of the commands, and publishes alarms as they occur.

When users Telnet to the CNR port, the system does not display a prompt.

3.2 Checking System Status

3.2.1 Checking Alarms and Input Frequency

The system can report current alarms, latched alarms, and the type of input signal.

To check system status:

- Type: **S** (case sensitive)

  You do not need to type a carriage return or line feed.

The system returns *Scccc,llll,x\r\n* where

- *cccc* is current alarms.
- *llll* is latched alarms since the last status request.

  Both *cccc* and *llll* are hexadecimal numbers, with each bit position representing one output. LSB (farthest right) is output 1. MSB is the input.
- *x* is one of the values for inputs shown in Table 2.

Table 2: Input values

Value	Input Frequency
0	Not 1 kHz, 5 kHz or Other
1	1 kHz
2	10 kHz
3	Other

Example: *S0000,0001,2*

This example shows that the system has no current alarms, output 1 alarmed since last status request, and the input frequency is 10 kHz. With no input signal, all output status bits will report 0.

3.2.2 Checking Model Number and Software Version

Both commands are case sensitive. You do not need to type a carriage return or line feed.

To check the TSC model number:

- Type: **I**

The system returns *4059B-00\r\n*.

Sending an **I** command will turn on the three front panel input LEDs for 2 seconds before returning to normal operation. This provides the capability for the user to ensure they are communicating over the Ethernet connection to the correct device via front panel feedback.

To check the software version

- Type: **V**

The system returns *Vxx\r\n* where *xx* is the software version.

Example: V80.

3.3 Understanding Alarm Output

The 4059B automatically publish alarms to the CNR port as they occur.

The alarms appear in the format *ALARMcccc* where *cccc* is the summary status of the input and output signals. The format of the alarm status is identical to the "S" command response for current status.

Example: *ALARM0008*

This example shows that output 4 failed. Output alarm monitoring will not detect a short on an output connector due to limitations of the internal monitoring circuitry. Output monitoring is designed to detect an internal fault in the 4059B.

4: Troubleshooting the 4059B

Perform all of the following procedures before returning the unit for service. If the unit still appears to have a problem, then call Symmetricom and request technical support. Have the serial number of your unit ready to provide to a technical representative.

4.1 Replacing Fuses

If you know that a local event caused blown fuses throughout a rack, you can replace the fuses in each unit's power entry module.

Required for this procedure:

- Small flat-head screwdriver.
- Replacement fuse for a standard IEC 320 power entry module with fuse (5 x 20 mm, 1 A 250 V Time lag fuse).

To replace a fuse:

1. Disconnect the power cable from the back of the unit.
2. Using a small screwdriver, open the fuse cover on the back of the unit.
3. Replace the old fuses as necessary.
4. Close the fuse cover.
5. Reconnect the power cable to the back of the unit.

4.2 Verifying Operational Problems

If the unit does not operate properly after you have verified that:

- the correct power is applied to the rear of the unit

  and

- the fuses are good

call Symmetricom to obtain a Returned Materials Authorization and return the unit to TSC for repair.

5: Warranty and Shipping Information

This chapter provides information on how to contact Symmetricom for warranty service, as well as shipping guidelines for the 4059B.

5.1 Warranty Information

The product carries a warranty from Symmetricom for a period of 1 year from date of shipment.

For repairs, contact Symmetricom:

www.symmetricom.com

support@symmetricom.com

Phone:

Worldwide (Main Number) 1-408-428-7907

USA toll-free 1-888-367-7966 (1-888-FOR-SYMM)

5.2 Shipping Information

If you need to ship this system for any reason, including returning equipment to Symmetricom for warranty service, follow these shipping instructions. Failure to follow these instructions may damage your system.

5.2.1 Packing Instructions

- Always ship the unit appropriately packaged to protect it from damage, preferably in the package in which it was originally shipped.
- No cables or connectors may be attached to the rear of the chassis.
- Wrap the chassis in plastic to protect against moisture.

6: Declaration of Conformity

Declaration of Conformity

In accordance with ISO/IEC GUIDE 22 and EN 45014

Symmetricom, Inc.
4775 Walnut St., Suite 1 B
Boulder, CO 80301-2574

Declares under our sole legal responsibility that the

DISTRIBUTION AMPLIFIER
MODEL NO. TSC 4032B
MODEL NO. TSC 4033A
MODEL NO. TSC 4036B
MODEL NO. TSC 4059B
MODEL NO. TSC 4130A

CONFORMS TO THE FOLLOWING EUROPEAN UNION DIRECTIVES:

Safety
2006/95/EC Low Voltage Directive (LVD)
IEC 61010-1:2001
EN 61010-1:2001

Electromagnetic Compatibility
2004/108/EC Electromagnetic Compatibility (EMC) Directive
EN61326 (2006) EMC Requirements for Measurement, Control and Laboratory Equipment, Class B
EN61000-3-2 (2006) Harmonic Current Emissions
EN61000-3-3 (1995) w/A1:2001, A2:2006 Voltage Fluctuation and Flicker Emissions

WEEE
Waste Electrical and Electronic Equipment Directive (WEEE) 2002/95/EC

For more information about Symmetricom's WEEE compliance and recycle program, please visit the Symmetricom's WEEE/RoHS website at
http://www.symmetricom.com/About_Us/WEEE_RoHS_Initiatives.htm

RoHS

Restriction of the Use of Certain Hazardous Substances Directive 2002/95/EC

This product falls under the category of Monitoring and Control Instruments Equipment (Category 9 as defined in Annex 1A of the WEEE 2002/96/EC Directive) which is excluded from the RoHS Directive 2002/95/EC (reference Article 2, paragraph 1) requirements.

We declare that the equipment specified above conforms to the above Directives and Standards.

03 November 2010	**Robert Mengelberg**	**Compliance Engineer**	*Robert Mengelberg*
Date	**Name**	**Title**	**Signature**

European Contact: Contact the Manufacturer directly at the address above.

Appendix A: Specifications

A.1 Electrical Specifications

Table 3 lists the electrical specifications for the 4059B.

Table 3: Electrical specifications

Item	Specification
Protection Class	Class I (Grounded Type)
Power Input Voltage	100 – 240 V~ 50/60 Hz 0.5 A **Note:** Fluctuations not to exceed ± 10% of nominal supply voltage. **Caution:** The above AC Power Supply specification reflects the overall Power Supply ratings. For UL and CE compliance the Power Supply must only be operated at 100 – 240 VAC, 50-60 Hz.
Power Inlet Type	IEC 60320 sheet C14
Power Supply Cord Set	18 AWG (0.75 mm^2 minimum)
Power Mains Fuse	(2) - 250V~1A Time lag 5x20 mm
Signal Input and outputs	■ Frequency 1 – 100 kHz ■ Input Impedance: 50 Ω ± 5 Ω, or 10k Ω (jumper selectable, 4059B only) ■ Input level < 6 V pp, output level 6 V pp ■ Output impedance: 50 Ω ± 5 Ω
Connectors	■ Input: 1 BNC ■ Output: 15 BNC ■ LAN: RJ-45
Gain	1.0 ± 10%
Isolation	> 70 dB
Modulation Ratio	Any
Code Format	Any

A.2 Environment Specifications

Warning
Ordinary protection: This unit is for **INDOOR USE ONLY.** It is not protected against a harmful ingress of moisture.
Equipment intended to be installed in an Enclosed/Open type equipment rack.

- Pollution Degree 2 per EN61010-1.
- Installation (Over-Voltage) Category II for transient over-voltages per EN 61010-1.
- Equipment suitable for continuous operation.

Table 4 lists the environmental specifications for the 4059B

Table 4: Environment specifications

Item	Temperature	Relative Humidity	Altitude
In Use	0°C to 50°C	0% to 95% (non-condensing)	3,000 meters (9,843 feet)
Storage	-40°C to 70°C	0% to 95% (non-condensing)	
Transportation	-40°C to 70°C	0% to 95% (non-condensing)	

A.4 Physical Specifications

Table 5 lists the physical specifications for the 4059B.

Table 5: Physical specifications

Item	Specification
Width	Standard 19-inch rack mount
Height	Standard 1U (~1.75 inches or 4.44 cm)
Depth	31.875 cm or 12.75 inches
Weight	Approximately 4.1 kg

Appendix B: Sales and Customer Assistance

Symmetricom's Customer Assistance Centers are a centralized resource to handle all of your customer needs.

Customer Assistance Center Telephone Numbers:

- Worldwide (Main Number): 1-408-428-7907
- USA, Canada, Latin America including Caribbean, Pacific Rim including Asia, Australia and New Zealand: 1-408-428-7907
- USA toll-free: 1-888-367-7966 (1-888-FOR-SYMM)
- Europe, Middle East & Africa: 49 700 32886435

Technical Support can be obtained either through the Online Support area of our website (http://www.symmetricom.com/support/online-support/ttm-product-support/), or by calling one of the above Customer Assistance Center numbers.

When calling the worldwide or USA-based number, select Option 1 at the first prompt. Telecom Solutions Division customers should then select Option 1; Timing, Test and Measurement Division customers should then select Option 2.

Technical Support personnel are available by phone:

- Between 7 a.m. to 5 p.m. Pacific Time, weekdays through the Main Customer Assistance Center number 1-408-428-7907.
- Between 8 a.m. to 5 p.m. Central European Time weekdays at the Europe, Middle East and Africa number 49 700 32886435.
- After hours support for emergencies only is handled through the worldwide (main) number 1-408-428-7907.

Customers who have purchased Technical Support Contracts may e-mail support requests to:

- support@symmetricom.com (Americas, Asia, Pacific Rim)
- emeasupport@symmetricom.com (Europe, Middle East, Africa)

Glossary

\n	Line feed
\r	Carriage return
CNR	Command and Response
DHCP	Dynamic Host Configuration Protocol
ESD	electrostatic discharge
LED	light-emitting diode
LSB	least significant bit
MSB	most significant bit
PDF	portable document format
PWA	printed wiring assembly
RF	radio frequency
TSC	Timing Solutions Corporation

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